

Oxidatively Stable Flexible Aerogel Composites for Reusable TPS, Phase I

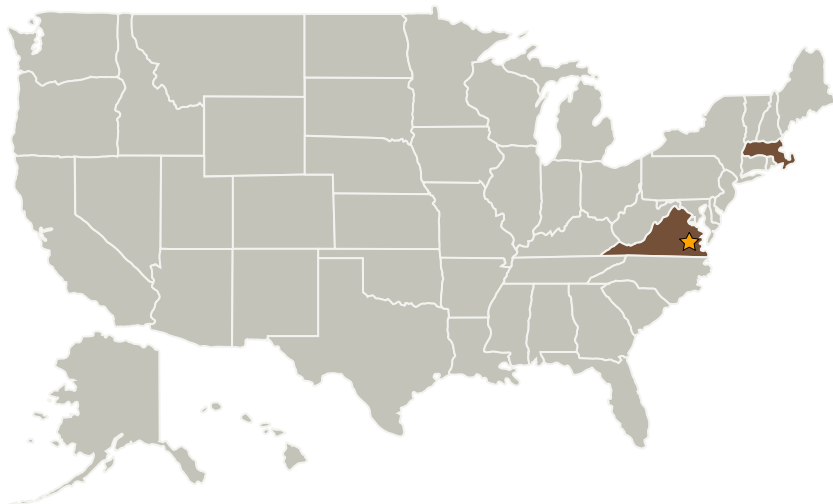
Completed Technology Project (2004 - 2004)



Project Introduction

NASA's Next Generation Launch Vehicle Technology Program has an interest in robust TPS materials with the highest level of thermal performance at the lowest possible areal weight. The materials need to be oxidatively stable and insensitive to water vapor, and able to perform with a minimum of material hysteresis over many cycles. Flexible silica aerogel composites, a class of super-insulation material recently developed by Aspen Aerogels, has not been utilized before in high temperature TPS designs. Thermophysical characterization data will be collected during the Phase I program for high-temperature durable, oxidatively stable, flexible aerogel composites at different densities, pressures and temperatures. The test data will be useful for re-entry TPS sizing studies, using existing aeroframe design and affiliated heat loads and environmental conditions for the re-entry trajectory. The materials optimized in the Phase I program will be available for thermal testing at NASA Langley under conditions relevant to Earth re-entry by reusable launch vehicles for the coldest layers of the TPS system. Aerogel augmented TPS designs are likely to save significant parasitic TPS weight compared to the most promising non-aerogel alternatives available today. The aerogels will be compatible with all high temperature capable face-skin materials.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Aspen Aerogels, Inc.	Supporting Organization	Industry	Northborough, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

George Gould

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.2 Avionics Systems and Subsystems
 - └ TX02.2.9 Hardware Enabling Secure Avionics